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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/580,406	09/23/2008	Vladimir Kouznetsov	2333-162	2093

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EXAMINER	
ABRAHAM, IBRAHIME A	

ART UNIT	PAPER NUMBER
1724	

NOTIFICATION DATE	DELIVERY MODE
10/03/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

RochesterIP@hblaw.com

Office Action Summary	Application No.	Applicant(s)	
	10/580,406	KOUZNETSOV, VLADIMIR	
	Examiner	Art Unit	
	IBRAHIME A. ABRAHAM	1724	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 September 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *23,24 and 26-42* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *23,24 and 26-42* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *24 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

1. Claims 23-24, and 26-42 are pending in the current office action. Claims 1-22 and 25 are cancelled due to response to restriction filed on 9/6/2011. Restriction is withdrawn since claims directed to non-elected groups are cancelled.

Claim Objections

2. Claim 23 is objected to because of the following informalities: Line 7 has a typographical error "35". Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. **Claims 23-24, 26-36, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. (US Pat# 5,744,016), in view of Actor et al. (US Pat# 6,521,106 B1).**

6. Regarding claim 23, Yamada teaches a magnetron reactive sputtering apparatus. (abstract) The apparatus includes a sputtering cathode 2 for generating a plasma source. A substrate holder 8 for holding a substrate 9 would read on an anode. The plasma is guided in a plasma outlet chamber for guiding plasma to the substrate. The plasma outlet chamber is connected to the plasma source. (col. 4, lines 29-54, and figure 2) Yamada teaches that a filter or collimation plate is placed between the target and the substrate. (col. 3, lines 1-29) The collimation plate or filter has a multiplicity of holes provided for plasma flow to substrate. (col.4, lines 40-54) Yamada further teaches that the reactive gas introduced in the sputtering apparatus is consumed mostly by the substrate 9, the shield plate 7, and the collimation plate 6. This would read on the filter having gettering/ adsorbing surfaces. Since nearly all the reactive gas is consumed before reaching the target, the target can remain uncontaminated by the reactive gas. (col. 5, lines 28-40, and figure 2)

7. Yamada does not expressly teach that the filter is made up of filter plates.

8. However, Actor teaches a sputtering apparatus utilizing a collimation filter. (abstract) Actor goes on to teach that the collimation filter is made using plates of hexagonal stamped plates arranged parallel to each other and welded together. (col. 7, lines 1-20)

a. It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the filter plates of Actor, in the apparatus of Yamada, in order to provide additional surface area for the collimation filter. The more surface area available in the filter would also increase the life of the filter.

9. Regarding claim 24, Yamada teaches that a filter or collimation plate is placed between the target and the substrate. (col. 3, lines 1-29) The collimation plate or filter has a multiplicity of holes provided for plasma flow to substrate. (col.4, lines 40-54)

10. Yamada does not expressly teach that the filter is made up of plates that cross each other.

11. However, Actor teaches a sputtering apparatus utilizing a collimation filter. (abstract) Actor goes on to teach that the collimation filter is made using plates of hexagonal stamped plates arranged parallel to each other and welded together. (col. 7, lines 1-20) Once welded together it is apparent that the same hexagonal shape can be made by rearranging the filter plates to cross each other and still having the same shape as taught by Actor.

b. It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the filter plates of Actor, in the apparatus of Yamada, in order to provide additional surface area for the collimation filter. The more surface area available in the filter would also increase the life of the filter. The rearrangement of the filter plates crossing each other does not provide a new or unexpected result. Rearrangement of parts has no patentable significance unless a new and unexpected result is provided. See MPEP 2144.04 VI

12. Regarding claim 26, Actor teaches that the collimation filter is made using plates of hexagonal stamped plates arranged parallel to each other and welded together. (col. 7, lines 1-20)

13. Regarding claim 27, Yamada teaches that a filter or collimation plate is placed between the target and the substrate. (col. 3, lines 1-29) The collimation plate or filter has a multiplicity of holes with a diameter of 1cm provided for plasma flow to substrate. (col.4, lines 40-54) The diameter of 1cm would read on a plate spacing of 1-10 cm.

14. Regarding claim 28, Yamada teaches that the shape of the cathode is circular shaped is similar to the shape confined by shield 5 which is also in a circular shape. (col. 5, lines 1-5, and figure 4 and 5)

15. Regarding claim 29, Yamada teaches the apparatus includes a sputtering cathode 2 for generating a plasma source. A substrate holder 8 for holding a substrate 9 would read on an anode. The plasma is guided in a plasma outlet chamber for guiding plasma to the substrate. The plasma outlet chamber is connected to the plasma source. (col. 4, lines 29-54, and figure 2) Yamada teaches that a filter or collimation plate is placed between the target and the substrate. (col. 3, lines 1-29) The collimation plate or filter has a multiplicity of holes provided for plasma flow to substrate. (col.4, lines 40-54) Yamada further teaches that the reactive gas introduced in the sputtering apparatus is consumed mostly by the substrate 9, the shield plate 7, and the collimation plate 6. This would read on the filter having gettering/ adsorbing surfaces. Since nearly all the reactive gas is consumed before reaching the target, the target can remain uncontaminated by the reactive gas. (col. 5, lines 28-40, and figure 2) This would also

read on the filter being transparent for metal and gas plasmas and not transparent for neutral vapor such as the reactive gas.

16. Regarding claim 30, Yamada teaches the filter is located in the plasma discharge chamber and the filter is electrically connected to the anode as seen in figure 2. The filter is connected to the shield and chamber which is connected to the substrate holder or anode. This would read on the filter being electrically connected to the anode. (figure 2)

17. Regarding claim 31, Yamada teaches the filter according to claim 23. The filter has getter/sorption surfaces that would be capable of being oriented along a magnetic field.

18. Regarding claim 32, Yamada teaches the filter according to claim 23. The filter has getter/sorption surfaces that would be capable for forming layers of solid material obtained from condensing of a vapor of solid material formed in the plasma source.

19. Regarding claims 33 and 34, Yamada teaches a DC power supply for applying power to the target. (col. 4, lines 37-40) The power supply of Yamada would be capable of applying voltage pulses between the anode and cathode in a high power pulsed regime.

20. Regarding claims 35 and 36, Yamada teaches that an inlet 10 is used to provide a sputtering gas and a reactive gas into the processing chamber. (col. 3, lines 59-62 and figure 2)

21. Regarding claim 42, Yamada teaches the plasma source according to claim 23. The plasma source of Yamada would be capable of depositing nonconductive metal oxides on a workpiece.

22. **Claims 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. (US Pat# 5,744,016) in view of Actor et al. (US Pat# 6,521,106 B1) as applied to claim 23 above, and further in view of Kouznetsov (WO 01/98553 A1 using PGPub US2004/0020760 A1).**

23. Regarding claims 33 and 34, Yamada teaches a DC power supply for applying power to the target. (col. 4, lines 37-40) The power supply of Yamada would be capable of applying voltage pulses between the anode and cathode in a high power pulsed regime.

24. However, even though Yamada might not explicitly teach the pulsed power supply, Kouznetsov teaches a pulsed highly ionized magnetron reactive sputtering apparatus. (abstract) Kouznetsov teaches that a pulsed power supply 19 is used for applying a bias between an anode and cathode. Kouznetsov further teaches that using the pulsed power supply in this manner results in electric discharges creating electrons that further ionize the gas in the process chamber. (par. 20 and figure 1)

c. It would have been obvious to one of ordinary skill in the art at the time of the invention to have applied the pulsed power supply of Kouznetsov, in the apparatus of Yamada in view of Actor, in order to increase the ionization of gas inside the chamber as taught by Kouznetsov.

25. **Claims 37-38, and 40-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. (US Pat# 5,744,016) in view of Actor et al. (US 6,521,106 B1) as applied to claim 23 above, and further in view of Feuerstein et al. (US Pat# 5,196,105).**

26. Regarding claims 37 and 38, Yamada teaches a vacuum chamber 1 which encompasses a plasma source and processing chamber. (col. 4, lines 29-31 and figure 2)

27. The combination of Yamada and Actor is silent as to the stationary magnetic mirror trap is provided in the vacuum vessel, the trap having an axis substantially coinciding with an axis of the vacuum vessel. Wherein the magnetic mirror trap comprises a workpiece magnet assembly located at a remote end of the process chamber behind the position of the workpiece as seen from a plasma outlet.

28. However, Feuerstein teaches a magnetron coating apparatus. (abstract) Feuerstein goes on to teach that a vacuum chamber 1 (col. 3, line 30 and figure 1), and 2 magnet coils 21 and 22. Magnetic coil 21 reads on a magnet assembly positioned behind the workpiece. Feuerstein teaches that the magnet coils form a "magnetic tune" that creates and envelope of plasma considered to be a "coating zone" around and past the work piece. This would read on a stationary magnetic mirror trap. The trap coincides with an axis of the vacuum chamber. Feuerstein further teaches that this arrangement allows for coating of larger workpieces. (col. 4, lines 25-68 and figure 1)

d. It would have been obvious to one of ordinary skill in the art at the time of the invention to have applied the stationary magnetic mirror trap of Feuerstein, in the apparatus of Yamada in view of Actor, in order to coat larger workpieces as taught by Feuerstein.

29. Regarding claim 40, Yamada and Actor is silent as to two plasma sources located in the same axis, the processing spaces and the anode spaces of the two plasma sources forming the vacuum vessel.

30. However, Feuerstein teaches a magnetron coating apparatus. (abstract) Feuerstein goes on to teach that a vacuum chamber 1 (col. 3, line 30 and figure 1), and 2 magnet coils 21 and 22. Magnetic coil 21 reads on a magnet assembly positioned behind the workpiece. Feuerstein teaches that the magnet coils form a "magnetic tune" that creates and envelope of plasma considered to be a "coating zone" around and past the work piece. This would read on a stationary magnetic mirror trap. The trap coincides with an axis of the vacuum chamber. Feuerstein teaches plasma sources 7 and 8 that are arranged in the same axis between one workpiece processing unit 25. Feuerstein further teaches that this arrangement allows for coating of larger workpieces. (col. 4, lines 25-68 and figure 1)

31. Regarding claim 41, Yamada teaches that one plasma source is used corresponding to one filter.

32. The combination of Yamada and Actor is silent as to the 4 plasma sources producing a cusped magnetic field with each plasma source having a filter.

33. However, Feuerstein teaches a magnetron coating apparatus. (abstract) Feuerstein goes on to teach that the two additional plasma sources 31 and 32 which with sources 7 and 8 would be capable of producing a cusped magnetic field. Feuerstein further teaches that this arrangement allows for coating of even larger workpieces. (col. 5, lines 36-60 and figure 3)

e. It would have been obvious to one of ordinary skill in the art at the time of the invention to have applied the plasma source arrangement of Feuerstein, in the apparatus of Yamada in view of Actor, in order to coat even larger workpieces as taught by Feuerstein.

34. **Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. (US Pat# 5,744,016) in view of Actor et al. (US 6,521,106 B1) and Feuerstein et al. (US Pat# 5,196,105) as cited above, and further in view of Kouznetsov (WO 01/98553 A1 using PGPub US2004/0020760 A1).**

35. Regarding claim 39, Yamada teaches a vacuum chamber 1 which encompasses a plasma source and processing chamber. (col. 4, lines 29-31 and figure 2)

36. The combination of Yamada and Actor is silent as to the stationary magnetic mirror trap is provided in the vacuum vessel, the trap having an axis substantially coinciding with an axis of the vacuum vessel. The magnetic mirror trap comprising two electromagnetic coils mounted outside the vacuum vessel to produce a magnetic field, a first one surrounding the anode space and a second one mounted opposite the cathode.

37. However, Feuerstein teaches a magnetron coating apparatus. (abstract) Feuerstein goes on to teach that a vacuum chamber 1 (col. 3, line 30 and figure 1), and 2 magnet coils 21 and 22. Magnetic coil 21 reads on a magnet assembly positioned behind the workpiece opposite the cathode. Feuerstein teaches that the magnet coils form a "magnetic tune" that creates and envelope of plasma considered to be a "coating zone" around and past the work piece. This would read on a stationary magnetic mirror trap. The trap coincides with an axis of the vacuum chamber. Feuerstein further teaches that this arrangement allows for coating of larger workpieces. (col. 4, lines 25-68 and figure 1)

f. It would have been obvious to one of ordinary skill in the art at the time of the invention to have applied the stationary magnetic mirror trap of Feuerstein, in the apparatus of Yamada in view of Actor, in order to coat larger workpieces as taught by Feuerstein.

38. The combination of Yamada, Actor, and Feuerstein does not explicitly teach that a first electromagnetic coil is surrounding the anode space.

39. However, Kouznetsov teaches a pulsed highly ionized magnetron reactive sputtering apparatus. (abstract) Kouznetsov teaches that an anode magnetic assembly 27 located in the outside of the vacuum chamber 1. (par. 18, 27 and figure 1) Kouznetsov further teaches that applying the magnetic field generated by the magnet assembly sustains the plasma density as it travels away from the cathode. (par. 28)

g. It would have been obvious to one of ordinary skill in the art at the time of the invention to have applied the magnet arrangement of Kouznetsov, in the

apparatus of Yamada in view of Actor and Feuerstein, in order to sustain a plasma density as it travels away from the cathode as taught by Kouznetsov.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IBRAHIME A. ABRAHAM whose telephone number is (571)270-5569. The examiner can normally be reached on M-F 8-4 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith D. Hendricks can be reached on (571)272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/IBRAHIME A ABRAHAM/
Examiner, Art Unit 1724

/Keith D. Hendricks/
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